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ABSTRACT

This document, which is intended for use by community and junior colleges throughout Mississippi, contains curriculum frameworks for the two course sequences of the state's postsecondary-level drafting and design technology program: architectural drafting technology and drafting and design technology. Presented first are a program description and both suggested course sequences. Section I lists baseline competencies taught in the program. Included in section II are outlines of each course in the residential carpentry technology course sequence: fundamentals of drafting, principles of computer-aided design (CAD), machine drafting I, intermediate CAD, descriptive geometry, architectural design I, elementary surveying, advanced CAD, structural drafting, mapping/topography, machine drafting II, quality assurance, computer numerical control drafting, geometric dimensioning and tolerancing, construction materials, fundamentals of machining processes, highway drafting, cost estimating, statics and strength of materials, electronic drafting, pipe drafting, architectural design II, steel ship building/design, special project, work-based learning in drafting and design technology, and blueprint reading I and II. Courses in the related academic sequence are as follows: English composition I, oral communications (principles of speech), and college algebra. Each course outline contains some/all of the following: course name and abbreviation; course classification; course description; prerequisites; and competencies and suggested objectives. Recommended tools and equipment are listed in section III. Appended are lists of related academic topics and workplace skills for the 21st century and student competency profiles for both courses. (MN)

# Mississippi Curriculum Framework for Drafting and Design Technology

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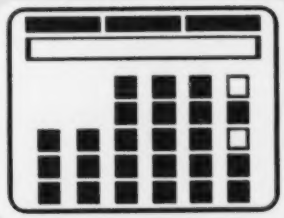

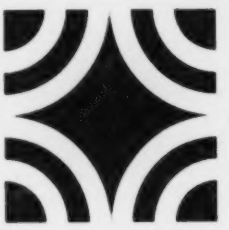

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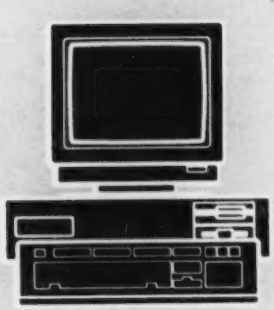

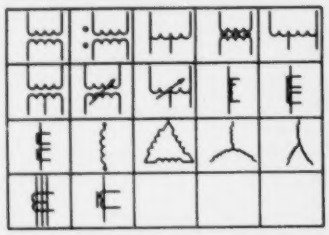

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***1996***

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# MISSISSIPPI

# CURRICULUM FRAMEWORK

# FOR

# DRAFTING AND DESIGN TECHNOLOGY

(Program CIP: 48.0102 – Architectural Drafting Technology)
(Program CIP: 48.0101 – General Drafting)

July 30, 1996

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# FOREWORD

In order to survive in today's global economy, businesses and industries have had to adopt new practices and procedures. Total quality management, statistical process control, participatory management, and other concepts of high performance work organizations are practices by which successful companies survive. Employers now expect their employees to be able to read, write, and communicate effectively; solve problems and make decisions; and interact with the technologies that are prevalent in today's workplace. Vocational-technical education programs must also adopt these practices in order to provide graduates who can enter and advance in the changing work world.

The curriculum framework in this document reflects these changes in the workplace and a number of other factors that impact on local vocational-technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and vocational skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U. S. Departments of Education and Labor, provide vocational educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

Each postsecondary program of instruction consists of a program description and a suggested sequence of courses which focus on the development of occupational competencies. Each vocational-technical course in this sequence has been written using a common format which includes the following components:

- Course Name - A common name that will be used by all community/junior colleges in reporting students.

- Course Abbreviation - A common abbreviation that will be used by all community/junior colleges in reporting students.

- Classification - Courses may be classified as:
  - Vocational-technical core - A required vocational-technical course for all students.
  - Vocational-technical elective - An elective vocational-technical course.
  - Related academic course - An academic course which provides academic skills and knowledge directly related to the program area.
  - Academic core - An academic course which is required as part of the requirements for an Associate degree.

- Description - A short narrative which includes the major purpose(s) of the course and the recommended number of hours of lecture and laboratory activities to be conducted each week during a regular semester.

- Prerequisites - A listing of any prerequisite courses that must be taken prior to or on enrollment in the course.

- Competencies and Suggested Objectives - A listing of the competencies (major concepts and performances) and of the suggested student objectives that will enable students to demonstrate mastery of these competencies.

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. For example, in a four semester hour course consisting of 30 hours lecture and 120 hours of laboratory activities, approximately 22 hours of lecture and 90 hours of lab should be taken by the competencies and suggested objectives identified in the course framework. The remaining 25 percent of each course should be developed at the local district level and may reflect:
  - Additional competencies and objectives within the course related to topics not found in the State framework, including activities related to specific needs of industries in the community college district.
  - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
  - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
  - Activities which implement components of the Mississippi Tech Prep initiative, including integration of academic and vocational-technical skills and coursework, school-to-career transition activities, and articulation of secondary and postsecondary vocational-technical programs.
  - Individualized learning activities, including worksite learning activities, to better prepare individuals in the courses for their chosen occupational area.

- Sequencing of the course within a program is left to the discretion of the local district. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

- Programs that offer an Associate of Applied Science degree must include a minimum 15 semester credit hour academic core. Specific courses to be taken within this core are to be determined by the local district. Minimum academic core courses are as follows:
  - 3 semester credit hours — Math/Science Elective
  - 3 semester credit hours — Written Communications Elective
  - 3 semester credit hours — Oral Communications Elective
  - 3 semester credit hours — Humanities/Fine Arts Elective
  - 3 semester credit hours — Social/Behavioral Science Elective

  It is recommended that courses in the academic core be spaced out over the entire length of the program, so that students complete some academic and vocational-technical courses each semester. Each community/junior college has the discretion to select the actual courses that are required to meet this academic core requirement.

- In instances where secondary programs are directly related to community and junior college programs, competencies and suggested objectives from the high school programs are listed as Baseline Competencies. These competencies and objectives reflect skills and knowledge that are directly related to the community and junior college vocational-technical program. In adopting the curriculum framework, each community and junior college is asked to give assurances that:
  - students who can demonstrate mastery of the Baseline Competencies do not receive duplicate instruction, and
  - students who cannot demonstrate mastery of this content will be given the opportunity to do so.

- The roles of the Baseline Competencies are to:
  - Assist community/junior college personnel in developing articulation agreements with high schools, and
  - Ensure that all community and junior college courses provide a higher level of instruction than their secondary counterparts

- The Baseline Competencies may be taught as special "Introduction" courses for 3-6 semester hours of institutional credit which will not count toward Associate degree requirements. Community and junior colleges may choose to integrate the Baseline Competencies into ongoing courses in lieu of offering the "Introduction" courses or may offer the competencies through special projects or individualized instruction methods.

- Technical elective courses have been included to allow community colleges and students to customize programs to meet the needs of industries and employers in their area.

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# DRAFTING AND DESIGN TECHNOLOGY

## PROGRAM DESCRIPTION

The Drafting and Design Technology program of study is designed to provide specialized occupational instruction in all phases of drafting technology in order to prepare students for positions in the drafting field. A combination of classwork and laboratory experience is stressed. Completion of a minimum of 64 semester credit hours of coursework in a two-year program leads to an Associate in Applied Science degree. Students who complete a minimum of 32 semester hours in drafting and design technology courses may earn a vocational certificate in general drafting.

The Drafting and Design Technology Concentration allows students to obtain skills and knowledge related to several fields of the drafting and design industry. The Architectural Drafting Technology Concentration provides students with specialized skills in the architectural drafting and design field.

July 30, 1996

# ARCHITECTURAL DRAFTING TECHNOLOGY

## SUGGESTED COURSE SEQUENCE*

Baseline Competencies for Drafting and Design Technology**

### FIRST YEAR

| | | | |
|---|---|---|---|
| 4 sch | Fundamentals of Drafting (DDT 1114) | 3 sch | Machine Drafting I (DDT 1133) |
| 3 sch | Humanities/Fine Arts Elective | 3 sch | Intermediate CAD (DDT 1323) |
| 3 sch | Principles of CAD (DDT 1313) | 3 sch | Elective |
| 3 sch | English Composition I (ENG 1113) | 3 sch | Oral Communications (Principles of Speech) (SPT 1113) |
| 3 sch | Math/Science Elective | 3 sch | Descriptive Geometry (DDT 1153) |
| 16 sch | | 15 sch | |

### SECOND YEAR

| | | | |
|---|---|---|---|
| 3 sch | Architectural Design I (DDT 1613) | 3 sch | Structural Drafting (DDT 2233) |
| 3 sch | Elementary Surveying (DDT 1413) | 3 sch | Mapping and Topography (DDT 2423) |
| 3 sch | Technical Elective | 3 sch | Technical Elective |
| 3 sch | Technical Elective | 3 sch | Technical Elective |
| 3 sch | Social/Behavioral Science Elective | 3 sch | Technical Elective |
| 3 sch | Advanced CAD (DDT 2343) | 15 sch | |
| 18 sch | | | |

* Students who lack entry level skills in math, English, science, etc. will be provided related studies.

** Baseline competencies are taken from the high school General Drafting program. Students who can document attainment of these competencies should not receive duplicate instruction. Students who cannot demonstrate attainment will be required to do so.

## TECHNICAL ELECTIVES - ARCHITECTURAL DRAFTING TECHNOLOGY

| | |
|---|---|
| 3 sch | Machine Drafting II (DDT 2163) |
| 3 sch | Quality Assurance (DDT 2263) |
| 3 sch | Geometric Dimensioning and Tolerancing (DDT 1143) |
| 3 sch | Construction Materials (DDT 1213) |
| 3 sch | Fundamentals of Machining Processes (DDT 1713) |
| 3 sch | Highway Drafting (DDT 2533) |
| 3 sch | Cost Estimating (DDT 2243) |
| 3 sch | Statics and Strength of Materials (DDT 2253) |
| 3 sch | Electronic Drafting (DDT 2513) |
| 3 sch | Pipe Drafting (DDT 2523) |
| 3 sch | Architectural Design II (DDT 2623) |
| 3 sch | Steel Ship Building and Design (DDT 2543) |
| 1-3 sch | Special Project [DDT 291(1-3)] |
| 1-6 sch | Work-Based Learning in Drafting and Design Technology [DDT 292(1-6)] |

July 30, 1996

# DRAFTING AND DESIGN TECHNOLOGY

## SUGGESTED COURSE SEQUENCE*

### Baseline Competencies for Drafting and Design Technology**

#### FIRST YEAR

| | | | |
|---|---|---|---|
| 4 sch | Fundamentals of Drafting (DDT 1114) | 3 sch | Machine Drafting I (DDT 1133) |
| 3 sch | Humanities/Fine Arts Elective | 3 sch | Intermediate CAD (DDT 1323) |
| 3 sch | Principles of CAD (DDT 1313) | 3 sch | Elective |
| 3 sch | English Composition I (ENG 1113) | 3 sch | Oral Communications (Principles of Speech) (SPT 1113) |
| 3 sch | Math/Science Elective | 3 sch | Descriptive Geometry (DDT 1153) |
| 16 sch | | 15 sch | |

#### SECOND YEAR

| | | | |
|---|---|---|---|
| 3 sch | Machine Drafting II (DDT 2163) | 3 sch | Structural Drafting (DDT 2233) |
| 3 sch | Elementary Surveying (DDT 1413) | 3 sch | Technical Elective |
| 3 sch | Technical Elective | 3 sch | Technical Elective |
| 3 sch | Architectural Design I (DDT 1613) | 3 sch | Mapping and Topography (DDT 2423) |
| 3 sch | Advanced CAD (DDT 2343) | 3 sch | Technical Elective |
| 3 sch | Social/Behavioral Science Elective | 15 sch | |
| 18 sch | | | |

* Students who lack entry level skills in math, English, science, etc. will be provided related studies.

** Baseline competencies are taken from the high school General Drafting program. Students who can document attainment of these competencies should not receive duplicate instruction. Students who cannot demonstrate attainment will be required to do so.

## TECHNICAL ELECTIVES - DRAFTING AND DESIGN TECHNOLOGY

| | |
|---|---|
| 3 sch | Geometric Dimensioning and Tolerancing (DDT 1143) |
| 3 sch | Construction Materials (DDT 1213) |
| 3 sch | Fundamentals of Machining Processes (DDT 1713) |
| 3 sch | Highway Drafting (DDT 2533) |
| 3 sch | Cost Estimating (DDT 2243) |
| 3 sch | Statics and Strength of Materials (DDT 2253) |
| 3 sch | Quality Assurance (DDT 2263) |
| 2 sch | Computer Numerical Control (CNC) Drafting (DDT 2362) |
| 3 sch | Electronic Drafting (DDT 2513) |
| 3 sch | Pipe Drafting (DDT 2523) |
| 3 sch | Architectural Design II (DDT 2623) |
| 3 sch | Steel Ship Building and Design (DDT 2543) |
| 1-3 sch | Special Project [DDT 291(1-3)] |
| 1-6 sch | Work-Based Learning in Drafting and Design Technology [(DDT 292(1-6)] |

# SECTION I:

# BASELINE COMPETENCIES

# BASELINE COMPETENCIES FOR DRAFTING AND DESIGN TECHNOLOGY

The following competencies and suggested objectives are taken from the publication *Mississippi Curriculum Framework for General Drafting*. These competencies and objectives represent the baseline which was used to develop the community/junior college Drafting and Design Technology courses. Students enrolled in postsecondary courses should either (1) have documented mastery of these competencies, or (2) be provided with these competencies before studying the advanced competencies in the Drafting and Design Technology program.

Baseline competencies may be integrated into existing courses in the curriculum or taught as special "Introduction" courses. The "Introduction" courses may be taught for up to six semester hours of institutional credit and may be divided into two courses. If the Baseline Competencies are to be taught as "Introduction" courses, each course should be at least 3 credit hours. The following course number(s) and description should be used:

**Course Name(s):** Introduction to Drafting and Design Technology, Introduction to Drafting and Design Technology I, or Introduction to Drafting and Design Technology II

**Course Abbreviation(s):** DDT 100(3-6), DDT 1013, DDT 1023

**Classification:** Vocational-Technical Core

**Description:** These courses contain the baseline competencies and suggested objectives from the high school General Drafting curriculum which directly relate to the community college Drafting and Design Technology program. The courses are designed for students entering the community college who have had no previous training or documented experience in the field. (3-6 semester hours based upon existing skills for each student. May be divided into 2 courses for a maximum total of 6 hours of institutional credit.)

**Competencies and Suggested Objectives:**

1. Describe local program and vocational center policies and procedures.
   a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, and transportation regulations.

   *Related Academic Topics (See Appendix A): C1, C4, C6*
   *Workplace Skills (See Appendix B): WP2, WP3, WP6*

2. Describe employment opportunities and responsibilities.
   a. Describe employment opportunities including potential earnings, employee benefits, job availability, places of employment, working conditions, and educational requirements.
   b. Describe basic employee responsibilities.

   *Related Academic Topics (See Appendix A): C1, C4, C6*
   *Workplace Skills (See Appendix B): WP2, WP3, WP6*
3. State procedures of leadership used to reach an agreement in an orderly manner and personal development opportunities provided students by the Vocational Industrial Clubs of America (VICA).
   a. State procedures of leadership used in organizational meetings to reach an agreement in an orderly manner.
   b. Describe the purposes of VICA.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP1, WP3, WP6*
4. Identify desirable personal behavior and characteristics.
   a. Identify desirable personality traits when serving the public.
   b. Identify desirable personality traits when communicating with employees, supervisors, and other employees.
   c. Identify desirable characteristics of the personal work ethic.

   *Related Academic Topics (See Appendix A): C4, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP3, WP6*
5. Identify legal requirements for participation in the occupation.
   a. Describe ways to avoid legal liability problems in the occupation.

   *Related Academic Topics (See Appendix A): C3, C4, C6*
   *Workplace Skills (See Appendix B): WP4, WP6*
6. Describe personal safety rules for working in the drafting industry.
   a. Identify and apply terms and definitions for safety.
   b. Identify OSHA inspections and citations.
   c. Identify accidents including causes and prevention.
   d. Identify general safety procedures.
   e. Identify causes of electrical hazards.
   f. Identify proper methods for moving heavy items.
   g. Identify and apply emergency first aid, if necessary.

   *Related Academic Topics (See Appendix A): C1, C4, C5*
   *Workplace Skills (See Appendix B): WP2, WP3*
7. Match drafting occupation job titles with qualifications and responsibilities and identify areas of specialization in the drafting profession.
   a. Match drafting occupation job titles with qualifications and responsibilities.
   b. Identify areas of specialization in the drafting profession.

   *Related Academic Topics (See Appendix A): C1, C4, C5, S8*
   *Workplace Skills (See Appendix B): WP2*

8. Describe goals of technical drawing including accuracy, acceptable technique, neatness, and speed.
   a. Describe the goals of technical drawing.
   *Related Academic Topics (See Appendix A): C1, C4, C5*
   *Workplace Skills (See Appendix B): WP2, WP3*
9. Identify and demonstrate drafting tools and identify media.
   a. Identify drafting tools.
   b. Operate blueprint machine.
   c. Match media and reproduction terms.
   d. Interpret architect, engineering, and metric scale units.
   *Related Academic Topics (See Appendix A): C1, M1, M4*
   *Workplace Skills (See Appendix B): WP2, WP5*
10. Demonstrate the ability to describe the rules of lettering.
   a. Describe the rules of lettering.
   *Related Academic Topics: (See Appendix A): C1, C4, C6, M1*
   *Workplace Skills (See Appendix B): WP2*
11. Construct uppercase gothic letters and numerals.
   a. Demonstrate uppercase gothic letters and numerals.
   *Related Academic Topics: (See Appendix A): C1, C4, C6, M1*
   *Workplace Skills (See Appendix B): WP2*
12. Match and identify basic geometric shapes and terms.
   a. Match geometric terms with their definition.
   b. Identify basic geometric shapes.
   *Related Academic Topics (See Appendix A): C1, C6, M5, S8*
   *Workplace Skills (See Appendix B): WP1, WP2, WP6*
13. Construct various geometric shapes using constructional techniques.
   a. Bisect a line and arc.
   b. Bisect an angle.
   c. Construct a perpendicular line from a point to a line.
   d. Divide a line into equal parts.
   e. Draw an arc tangent to a straight line and an arc.
   f. Draw an arc tangent to two arcs.
   g. Construct an octagon.
   h. Construct a hexagon.
   i. Construct a line parallel to a given line.
   *Related Academic Topics (See Appendix A): C1, C6, M5, S8*
   *Workplace Skills (See Appendix B): WP1, WP2, WP6*
14. Match orthographic terms with definitions.
   a. Match terms of orthographic projections with their definitions.
   *Related Academic Topics (See Appendix A): C1, C2, C6, M2, M5*
   *Workplace Skills (See Appendix B): WP2, WP6*
15. Demonstrate the ability to describe principal views possible in orthographic projection.
   a. Describe principal views in orthographic projection.

*Related Academic Topics (See Appendix A): C1, C2, C6, M2, M5*
*Workplace Skills (See Appendix B): WP2, WP6*

16. Demonstrate the ability to construct principal views in orthographic projection.
    a. Construct top view with front and right sides given.
    b. Construct front view with top and right sides given.
    c. Construct right side with top and front views given.
    d. Construct a 3-view drawing from a pictorial.

    *Related Academic Topics (See Appendix A): C1, C2, C6, M2, M5*
    *Workplace Skills (See Appendix B): WP2, WP6*
17. Demonstrate the ability to use CAD hardware and software.
    a. Match CAD hardware/software terms with definitions.
    b. Demonstrate care and maintenance of computer software/hardware.
    c. Start up/shut down CAD system.
    d. Load CAD program and save drawing on hard drive and floppy disk.
    e. Operate plotter/printer.

    *Related Academic Topics (See Appendix A): C1, C4, C6, M5, S8*
    *Workplace Skills (See Appendix B): WP2, WP5, WP6*
18. Construct orthographic and pictorial drawings on the CAD system.
    a. Construct an orthographic drawing on the CAD system.
    b. Construct a pictorial drawing on the CAD system.

    *Related Academic Topics (See Appendix A): C1, C4, C6, M5, S8*
    *Workplace Skills (See Appendix B): WP2, WP5, WP6*
19. Demonstrate the ability to apply techniques of dimensioning.
    a. Apply basic line types used in dimensioning.
    b. Demonstrate use of aligned and unidirectional systems.
    c. Apply rules for dimensioning techniques.
    d. Identify and locate finish marks on drawings.
    e. Explain the purpose for notations on drawings.
    f. Describe machine processes.

    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M5*
    *Workplace Skills (See Appendix B): WP2, WP3*
20. Describe and draw threads.
    a. Describe uses of threads.
    b. Describe types of thread forms.
    c. Interpret thread notes.
    d. Describe methods of thread representation.
    e. Draw an internal and external thread form.

    *Related Academic Topics (See Appendix A): C1, C4*
    *Workplace Skills (See Appendix B): WP2, WP6*
21. Describe the techniques and types of sectional views.
    a. Identify types of section views.
    b. Describe the techniques for developing sectional views.

    *Related Academic Topics (See Appendix A): C1, C2, C6*
    *Workplace Skills (See Appendix B): WP2, WP6*

22. Construct sectional views.
    a. Construct full sections.
    b. Construct half sections.
    *Related Academic Topics (See Appendix A): C1, C2, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
23. Demonstrate the ability to construct primary auxiliary views.
    a. Discuss the methods of constructing primary auxiliary views.
    b. Construct a primary auxiliary view.
    *Related Academic Topics (See Appendix A): C1, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
24. Demonstrate the ability to list and describe the different types of pictorial drawings.
    a. List the different types of pictorial drawings.
    b. Describe the differences in pictorial drawings.
    *Related Academic Topics (See Appendix A): C1, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
25. Construct pictorial drawings.
    a. Construct an isometric drawing.
    b. Construct an oblique drawing.
    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
26. Describe local program and vocational center policies and procedures.
    a. Describe local program and vocational center policies and procedures including dress code, attendance, academic requirements, discipline, and transportation regulations.
    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP3, WP6*
27. Describe employment opportunities and responsibilities.
    a. Describe employment opportunities including potential earnings, employee benefits, job availability, places of employment, working conditions, and educational requirements.
    b. Describe basic employee responsibilities.
    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP3, WP6*
28. Describe personal safety rules for working in the drafting industry.
    a. Identify and apply terms and definitions for safety.
    b. Identify OSHA inspections and citations.
    c. Identify accidents including causes and prevention.
    d. Identify general safety procedures.
    e. Identify causes of electrical hazards.
    f. Identify proper methods for moving heavy items.
    g. Identify and apply emergency first aid, if necessary.
    *Related Academic Topics (See Appendix A): C1, C4, C5*
    *Workplace Skills (See Appendix B): WP2, WP3*

29. Develop advanced leadership and organizational skills.
    a. Identify VICA leadership and skills competition activities.
    b. Identify similarities between VICA leadership skills and workplace leadership skills.

    *Related Academic Topics (See Appendix A): C5, C6*
    *Workplace Skills (See Appendix B): WP1, WP3, WP6*
30. Develop employability skills.
    a. Prepare a resume containing essential information.
    b. Complete a job application form.
    c. Explain procedures for job interviews using correct job etiquette.
    d. Demonstrate the role of an applicant in a job interview.

    *Related Academic Topics (See Appendix A): C1, C3, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP3, WP6*
31. Demonstrate the ability to describe the functions and organization of the architectural profession.
    a. Describe architectural drafting terms.
    b. Prepare a report on architectural drafting.
    c. Match job titles with qualifications, responsibilities, and legal requirements for entering the architectural drafting field.

    *Related Academic Topics (See Appendix A): C1, C4, C5*
    *Workplace Skills (See Appendix B): WP2*
32. Demonstrate the ability to produce sketches in planning the three main residential areas.
    a. Describe requirements for the three main residential areas.
    b. Sketch rooms including service, living, and sleeping areas, and floor plan.

    *Related Academic Topics (See Appendix A): C1, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
33. Demonstrate the ability to describe the structural systems and construction materials.
    a. Define structural systems and building materials terms.
    b. Identify symbols on plan, elevation, and/or section drawings.

    *Related Academic Topics (See Appendix A): C1, C2, C4*
    *Workplace Skills (See Appendix B): WP2*
34. Demonstrate the skills necessary for producing an architecturally correct floor plan.
    a. Interpret measurements using architect's scale.
    b. Construct architectural letters.
    c. Draw and dimension a floor plan.

    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4, S6*
    *Workplace Skills (See Appendix B): WP2, WP6*
35. Demonstrate the ability to produce an architecturally correct foundation plan.
    a. Draw a foundation plan.

    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4, S6*
    *Workplace Skills (See Appendix B): WP2, WP6*

36. Demonstrate the ability to produce an electrical plan.
    a. Draw an electrical plan.
    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4, S6*
    *Workplace Skills (See Appendix B): WP2, WP6*
37. Demonstrate the ability to produce elevation drawings.
    a. Draw an elevation plan.
    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4, S6*
    *Workplace Skills (See Appendix B): WP2, WP6*
38. Demonstrate the ability to draw, dimension, and label an exterior wall section.
    a. Draw a typical exterior wall section.
    b. Dimension and label a typical exterior wall section.
    *Related Academic Topics (See Appendix A): C1, C3, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP3, WP6*
39. Develop a floor plan by utilizing a microcomputer.
    a. Draw, dimension, and plot a floor plan using a microcomputer.
    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4*
    *Workplace Skills (See Appendix B): WP2, WP6*
40. Develop architectural elevations using a microcomputer.
    a. Draw elevations using a microcomputer.
    *Related Academic Topics (See Appendix A): C1, C2, C4, C6, M1, M4*
    *Workplace Skills (See Appendix B): WP2, WP6*
41. Develop the skills needed to operate a plotter/printer.
    a. Operate a plotter/printer.
    *Related Academic Topics (See Appendix A): C1, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP5, WP6*
42. Demonstrate the ability to utilize the basic elements of civil drafting.
    a. Describe civil drafting terms.
    b. Match job titles with qualifications, responsibilities, and licensing/bonding requirements.
    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP6*
43. Develop a plot/site plan.
    a. Draw a plot/site plan.
    *Related Academic Topics (See Appendix A): C1, C4, C6, M1*
    *Workplace Skills (See Appendix B): WP2, WP6*
44. Demonstrate the ability to apply information on the plumbing and HVAC profession.
    a. Describe plumbing and HVAC terms.
    b. Match job titles with qualifications, responsibilities, and licensing/bonding requirements.
    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP6*
45. Demonstrate the ability to draw a basic plumbing plan.
    a. Draw a basic plumbing schematic for a residential building.

*Related Academic Topics (See Appendix A): C1, C4, C6*
*Workplace Skills (See Appendix B): WP2, WP6*

46. Demonstrate the ability to draw a basic HVAC plan for a residential building.
    a. Draw a basic HVAC plan for a residential building.

    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP6*
47. Describe a basic residential wiring plan.
    a. Describe electrical terms.
    b. Match job titles with qualifications, responsibilities, and licensing/bonding requirements.

    *Related Academic Topics (See Appendix A): C1, C4, C6*
    *Workplace Skills (See Appendix B): WP2, WP6*
48. Demonstrate the ability to develop a basic residential wiring plan.
    a. Draw a basic electrical schematic.

    *Related Academic Topics (See Appendix A): C1, C4, C6, M1, S6*
    *Workplace Skills (See Appendix B): WP2, WP6*

# SECTION II:

# CURRICULUM GUIDE

# FOR

# DRAFTING AND DESIGN TECHNOLOGY

# DRAFTING AND DESIGN TECHNOLOGY COURSES

**Course Name:** Fundamentals of Drafting

**Course Abbreviation:** DDT 1114

**Classification:** Vocational-Technical Core

**Description:** Course designed to give drafting majors the background needed for all other drafting courses. (4 sch: 2 hr. lecture, 4 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Discuss classroom procedures and drafting occupations.
   a. Describe proper classroom/lab procedures.
   b. Describe the various occupations in drafting and their requirements.
   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Explain and apply safety rules and regulations.
   a. Describe safety rules for drafting occupations.
   b. List and discuss hazardous materials found in the drafting area.
   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to apply proper techniques in instrument drawings.
   a. Demonstrate the ability to scale drawings.
   b. Construct various angles.
   c. Recognize and construct the different types of lines.
   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
4. Demonstrate the ability to sketch and develop views of basic shapes.
   a. Develop a pictorial view from three principal views.
   b. Develop three principal views from a pictorial view.
   c. Complete three principal views when lines are missing.
   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
5. Demonstrate the ability to use geometric constructions.
   a. Construct tangent arcs and lines.
   b. Divide lines or arcs into equal and/or proportional parts.
   c. Develop geometric shapes.
   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
6. Demonstrate the ability to construct orthographic projections.
   a. Construct a top view, with front and right side views given.
   b. Construct a front view, with top and right side views given.

c. Construct a right side view, with top and front views given.
d. Develop a drawing consisting of three principal views.

*Related Academic Topics (See Appendix A): C2, C5, C6*
*Workplace Skills (See Appendix B): WP2, WP5, WP6*

7. Demonstrate the ability to dimension objects.
   a. Recognize lines, symbols, features, and conventions used in dimensioning.
   b. Recognize and use size and location dimensions.
   c. Recognize and use general and local notes.
   d. Dimension a drawing using contour, chain, and baseline dimensioning.

   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
8. Demonstrate the ability to construct sectional views.
   a. Construct full and half sectional views.
   b. Recognize and construct removed, revolved, offset, and aligned sectional views.

   *Related Academic Topics (See Appendix A): C2, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Principles of CAD

**Course Abbreviation:** DDT 1313

**Classification:** Vocational-Technical Core

**Description:** This course will introduce the student to the operating system and how to perform basic drafting skills on the CAD. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to manage the operating system.
   a. Format, label, and examine the contents of floppy disks.
   b. List, erase, rename, and copy files on floppy and hard disks.
   c. Create, remove, and move files between directories and subdirectories.
   d. Set the date and time on the computer.
   e. Examine the contents of files.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to use the basic hardware of the CAD system.
   a. Input data using keyboard, graphics tablet, and mouse.
   b. Access files and/or symbols from the hard disk.
   c. Store, retrieve, copy, and delete drawings and files.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to perform drafting functions on the CAD system.
   a. Construct a drawing using the draw command.
   b. Produce a drawing utilizing the construct command.
   c. Utilize the modify commands.
   d. Utilize the settings variables.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Machine Drafting I

**Course Abbreviation:** DDT 1133

**Classification:** Vocational-Technical Core

**Description:** Emphasizes methods, techniques, and procedures in presenting screws, bolts, rivets, springs, thread types, symbols for welding, materials, finish and heat treatment notation, working order preparation, routing, and other drafting room procedures. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to create drawings of fasteners.
   a. Create a drawing of fasteners from written descriptions and sketches.
   b. Represent different types and shapes of fasteners by following standard tables as to sizes, fits, and dimensions.

   *Related Academic Topics (See Appendix A): C1, C2, C3, C5, C6, M2, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Prepare drawings for production.
   a. Label a set of drawings with parts list, title block information, and drawing numbers.
   b. Create detailed drawings involving cams, gears, and pulleys from sketches and written descriptions.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M4, M5, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Prepare welding drawings.
   a. Identify the welding symbols used on welding prints.
   b. Create a drawing which will represent joint types, weld types, and welding symbols, using standard welding symbols.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M4, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Intermediate CAD

**Course Abbreviations:** DDT 1323

**Classification:** Vocational-Technical Core

**Description:** This course is designed as a continuation of Principles of CAD. Subject areas will include dimensioning, sectional views, and symbols. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Principles of CAD (DDT 1313)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to dimension drawings by the use of CAD.
   a. Draw and dimension a 2-view drawing per ANSI/ISO standards.
   b. Draw and dimension a 3-view drawing per ANSI/ISO standards.
   c. Apply dimensions using unidirectional and aligned systems of dimensions.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Draw sectional views in CAD.
   a. Draw a multiview drawing including a full section and apply section lining.
   b. Draw a multiview drawing including a half section and apply section lining.
   c. Draw a multiview drawing including an offset section and apply section lining.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Descriptive Geometry

**Course Abbreviation:** DDT 1153

**Classification:** Vocational-Technical Core

**Description:** Theory and problems designed to develop the ability to visualize points, lines, and surfaces of space. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to develop views.
   a. Read and analyze a multiview drawing by lines and surfaces.
   b. Construct top, front, and auxiliary adjacent views.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to solve problems of spatial relationships.
   a. Locate points and lines in space.
   b. Find true lengths and slopes of lines.
   c. Recognize parallel, intersecting, and perpendicular lines and solve problems related to each.
   d. Draw lines in a prescribed direction.
   e. Derive an axonometric view.
   f. Locate points and lines in a plane.
   g. Solve slope, strike, and true size of plane problems.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to solve problems of lines, planes, and angles.
   a. Determine the intersection of a line and plane.
   b. Determine the intersection to two planes.
   c. Solve problems involving dihedral angles.
   d. Solve a basic revolution of a line and point problem.
   e. Solve problems involving the intersection of two prisms, a cylinder and a prism, and a cone and a cylinder.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Architectural Design I

**Course Abbreviation:** DDT 1613

**Classification:** Vocational-Technical Core

**Description:** Presentation and application of architectural drafting room standards. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to plan a simple residential structure.
   a. Describe architectural terms.
   b. Describe the planning areas.
   c. Identify and apply building codes.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to draw a complete set of working drawings for a simple architectural structure.
   a. Select the correct scale for the different drawings.
   b. Draw a complete floor plan.
   c. Draw a complete set of elevations.
   d. Draw a site plan.
   e. Draw an electrical plan.
   f. Draw interior elevations and details as needed.
   g. Draw a window and door schedule.
   h. Draw necessary details and section views.
   i. Draw a foundation plan with details.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Elementary Surveying

**Course Abbreviation:** DDT 1413

**Classification:** Vocational-Technical Core

**Description:** Basic course dealing with principles of geometry, theory, and use of instruments, mathematical calculations, and the control and reduction of errors. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to measure and record various measurements.
   a. Describe the use of the United States Geological Survey benchmark.
   b. Measure horizontal and vertical angles.
   c. Measure horizontal and vertical distances in English and metric.
   d. Demonstrate differences in elevation between random points.
   e. Record and interpret field notes.
   f. Explain the various duties of each member of a survey party.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the use of surveying equipment, terms, and signals.
   a. Identify and explain the basic surveying equipment.
   b. Set up the equipment, shoot elevations, and record.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Advanced CAD

**Course Abbreviation:** DDT 2343

**Classification:** Vocational-Technical Core

**Description:** This course is designed as a continuation of Principles of CAD. Emphasis is placed on attributes, slide shows, the user coordinate system, 3-D faces, and solid modeling. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Principles of CAD (DDT 1313)

**Competencies and Suggested Objectives:**

1. Chart a "slide show."
   a. Create a series of slides.
   b. Use a text editor to create script file.
   c. Run a script file.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Assign attributes and generate a bill of materials.
   a. Assign visible or hidden values to blocks.
   b. Edit attributes in existing blocks.
   c. Construct a template file for the collection of block attributes.
   d. Collect attributes values in a bill of materials.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to create wire frame 3-D objects (3DFACF).
   a. Demonstrate the ability to control the "user coordinate system" (UCS).
   b. Create 3-D faces.
   c. Rotate objects.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
4. Demonstrate the ability to create solid models.
   a. Demonstrate the ability to extrude objects.
   b. Remove hidden lines.
   c. Control the VPOINT (View Point).
   d. Extract 2-D views from 3-D objects.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Structural Drafting

**Course Abbreviation:** DDT 2233

**Classification:** Vocational-Technical Core

**Description:** Structural section, terms, and conventional abbreviations and symbols used by structural fabricators and erectors are studied. Knowledge is gained in the use of the A.I.S.C. Handbook. Problems are studied that involve structural designing and drawing of beams, columns, connections, trusses, and bracing (steel, concrete, and wood). (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to utilize data on design of structural members.
   a. Identify and describe physical properties of materials.
   b. Read and interpret data utilizing standard references.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to construct structural plans.
   a. Draw a detail of connections of structural members including bolting and welding.
   b. Draw structural framing plans.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

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**Course Name:** Mapping and Topography

**Course Abbreviation:** DDT 2423

**Classification:** Vocational-Technical Core

**Description:** Selected drafting techniques are applied to the problem of making maps, traverses, plot plans, plan drawings, and profile drawings using maps, field survey data, aerial photographs, and related references and materials including symbols, notations, and other applicable standardized materials. (3 sch: 2 hr. lecture, 2 hr. lab)

**Co/Prerequisites:** Elementary Surveying (DDT 1413) and Intermediate CAD (DDT 1323)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to plan and draw a map.
   a. Explain and draw a plan and profile.
   b. Define the various maps and symbols used in mapping.
   c. Prepare a contour map.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to transform field notes into engineering drawings.
   a. Explain what an engineering drawing is.
   b. Determine the correct scale size.
   c. Explain what information is needed from the field notes to complete a drawing.
   d. Complete a drawing from field notes.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Machine Drafting II

**Course Abbreviation:** DDT 2163

**Classification:** Vocational-Technical Core (Drafting and Design Technology); Vocational-Technical Elective (Architectural Drafting Technology)

**Description:** A continuation of Machine Drafting I with emphasis on advanced techniques and knowledge employed in the planning of mechanical objects. Includes instruction in the use of tolerancing and dimensioning techniques. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Machine Drafting I (DDT 1133)

**Competencies and Suggested Objectives:**

1. Create drawings from a given mechanical part.
   a. Sketch the given part.
   b. Take and record measurements from the given part.
   c. Prepare a finished drawing.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to construct design working drawings.
   a. Apply modification techniques.
   b. Apply geometric tolerancing.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Quality Assurance

**Course Abbreviation:** DDT 2263

**Classification:** Vocational-Technical Elective

**Description:** The application of statistics and probability theory in quality assurance programs. Various product sampling plans will be studied as well as the development of product charts for defective units. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to utilize basic quality assurance procedures.
   a. Discuss the history, development, and current trends of quality assurance and the use of quality circles.
   b. Describe the concept of probability.
   c. Compute the following measurements of central tendency: mean, median, and mode for a given set of data.
   d. Describe the frequency distribution for a normal population.
   e. Distinguish between the terms "accuracy," "precision," and "accuracy and precision."
   f. Compute the standard deviation and the square of the residuals for a given set of data.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to effectively use sampling techniques.
   a. Describe the process of random sampling as applied to quality assurance.
   b. Compare single and multiple sampling plans.
   c. Describe the characteristics of the Mil. Std. 105D sampling plan.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to effectively use various charts.
   a. Describe the general theory of a control chart.
   b. Describe the development and use of fraction defective charts in quality assurance.
   c. Discuss special applications of control charts in quality assurance.
   d. Apply quality assurance procedures in a laboratory setting.

*Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
*Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Computer Numerical Control (CNC) Drafting

**Course Abbreviations:** DDT 2362

**Classification:** Vocational-Technical Elective (Drafting and Design Technology)

**Description:** A course to introduce students to the basics of numerical control machines. (2 sch: 1 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to identify the basic functions of CNC.
   a. List the advantages and disadvantages of CNC.
   b. Define terms related to CNC machines.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5*
2. Develop the ability to define the principles of the coordinate systems.
   a. Define and discuss the Cartesian Coordinate System.
   b. Define and discuss the Absolute Coordinate System.
   c. Define and discuss the Incremental Coordinate System.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5*
3. Identify the principles of the code system.
   a. Identify the common code words.
   b. Identify the common address formats.
   *Related Academic Topics (See Appendix A): C2, C3, C5*
   *Workplace Skills (See Appendix B): WP2, WP5*
4. Develop the ability to prepare and execute a basic CNC program.
   a. Compute the tool length and cutter radii compensation.
   b. Identify sub-programs.
   c. Write a program for milling linear and circular cuts.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Geometric Dimensioning and Tolerancing

**Course Abbreviations:** DDT 1143

**Classification:** Vocational-Technical Elective

**Description:** A continuation of conventional dimensioning with emphasis on concepts as adopted by the American National Standards Institute (ANSI). A study of international dimensioning symbols used to control tolerances of form, profile, orientation, runout, and location of features on an object. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Machine Drafting I (DDT 1133)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability of dimensioning and tolerancing symbols, terms, definitions, and concepts.
   a. Describe a feature control frame and its elements.
   b. Identify geometric characteristic symbols.
   c. List the material condition symbols and describe their purposes.
   d. Define the term "basic dimensions."
   e. Explain what the term "datum" implies.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to apply "geometric dimensioning and tolerancing" on a drawing.
   a. Prepare a fully dimensioned drawing complete with geometric dimensioning and tolerancing.
   b. Interpret a basic feature control frame.
   c. Explain and interpret the effects of the modifiers on the tolerance zone.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Construction Materials

**Course Abbreviation:** DDT 1213

**Classification:** Vocational-Technical Elective

**Description:** A course designed to familiarize the student with the physical properties of the materials generally used in the erection of a structure, with a brief description of their manufacture. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Describe the uses of wood components used in construction.
   a. Identify and describe diseases and lumber defects.
   b. Calculate board feet of lumber.
   c. Identify the different types of lumber used in construction and their design factors.

   *Related Academic Topics (See Appendix A): C1, C2, C5, C6, M1, M2, M3, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Describe concrete characteristics.
   a. Describe the use of common and special types of concrete.
   b. Classify aggregates.
   c. Explain how the design and control of concrete is maintained.
   d. Describe the psi rating system for concrete.
   e. Identify and describe common concrete and brick masonry units.
   f. Explain purposes of concrete additives.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M4, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Describe the use of bricks in construction.
   a. Describe different types of bricks.
   b. Describe the different types of brick bonds.
   c. Identify and describe the brick pattern bonds.
   d. Identify and describe the different mortar joints.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M3, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
4. Describe various cover materials used in construction.
   a. Identify and describe the different types of exterior wall materials and their specific purposes.
   b. Identify and describe different types of insulating materials and their special purposes.
   c. Identify and describe the different types of floor coverings and their special uses.

d. Identify and describe the different types of roofing materials.
e. Identify and describe the different types of finishing materials and their special uses.
f. Identify and describe different types of protective and decorative coatings and their special uses.

*Related Academic Topics (See Appendix A): C1, C3, C2, C5, C6, M2, S8*
*Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Fundamentals of Machining Processes

**Course Abbreviation:** DDT 1713

**Classification:** Vocational-Technical Elective

**Description:** An introduction to basic machining equipment and safety procedures. Emphasis is placed on measurement techniques, machine technology, machine tools, and applications. (A course for drafting students with no previous machining experience.) (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to identify and apply skills to basic machining processes.
   a. Describe how the concept of interchangeable parts contributes to mass production.
   b. Describe the manufacturing processes for a typical industry.
   c. Identify the major systems for measurement used in industry today; define their units of measure; and convert measurements from one system to another.
   d. Identify and describe the use of instruments and tools used to make measurements in industry.
   e. Demonstrate the use of measurement instruments and tools to include: internal and external micrometers, internal and external calipers, and rules.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Discuss the safe use of basic tools and machines.
   a. Identify and describe the safe use of common bench and hand tools.
   b. Discuss the safe use of a pedestal grinder.
   c. Discuss the safe use of a drill press.
   d. Identify and describe the safe use of the major parts, sub-parts, and accessories of an engine lathe.
   e. Identify and describe the safe use of the major parts of a milling machine and its accessories.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Highway Drafting

**Course Abbreviations:** DDT 2533

**Classification:** Vocational-Technical Elective

**Description:** A study of basic information to highway drafting. Horizontal alignment of route surveys in the plan view, vertical alignment of route surveys in the profile view, typical sections, cross sections, and area calculations and estimation of quantities. (3 sch: 2 hr. lecture, 2 hr. lab.)

**Prerequisites:** Fundamentals of Drafting (DDT 1114) and Intermediate CAD (DDT 1323)

**Competencies and Suggest Objectives:**

1. Identify basic information for highway drafting.
   a. Draw symbols and abbreviations.
   b. Identify and apply the use of the correct scale.
   c. Identify terms of land survey data.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to draw horizontal and vertical alignment of route surveys.
   a. Plot by bearing and by deflection angles.
   b. Reduce field notes.
   c. Establish grade and slope.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Demonstrate the ability to draw typical and cross sections.
   a. Draw a single and multiple roadway.
   b. Reduce and plot field notes.
   c. Superimpose typical sections.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Cost Estimating

**Course Abbreviation:** DDT 2243

**Classification:** Vocational-Technical Elective

**Description:** Preparation of material and labor quantity surveys from actual working drawings and specifications. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Develop the ability to make a cost estimate of a residential and commercial building.
   a. Define the different types of estimates and specific purposes of each.
   b. Prepare estimates of various kinds of foundations.
   c. Estimate wall frames.
   d. Estimate ceiling frames.
   e. Estimate roof frames.
   f. Estimate exterior finishings.
   g. Estimate interior finishings.
   h. Estimate sub-contract items.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to determine the best construction method.
   a. List the different types of construction in residential and commercial buildings.
   b. Select the best method of construction in a residential and commercial buildings.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Develop the ability to apply the principles of contracts for construction.
   a. Identify and describe the essential elements of a contract.
   b. Describe how contracts are terminated.
   c. Describe different types of construction contracts and their specific purpose.
   d. List bidding procedures.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

4. Demonstrate the ability to complete a materials list for a structure.
   a. Describe the procedures of doing a materials list.
   b. Explain the purposes for a materials list.
   c. Complete a materials form for a construction project.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Statics and Strength of Materials

**Course Abbreviation:** DDT 2253

**Classification:** Vocational-Technical Elective

**Description:** Study of forces acting on bodies; movement of forces; stress of materials; basic machine design; beams, columns, and connections. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** College Algebra (MAT 1313)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to apply basic procedures of determining the behavior of structures under loads.
   a. Identify and solve force systems.
   b. Graphically solve and verify mathematical problems involving force systems.
   c. Read or use stress and strain curves.
   d. Calculate the results of tensile and compression loading.
   e. Calculate the elastic limit of materials.
   f. Calculate the ultimate strength of materials.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to determine the loadings of structures.
   a. Draw and calculate shear and moment diagrams.
   b. Calculate the loading, both live and static, on a simple structure.
   c. Draw and calculate the bending moment diagram.
   d. Draw and calculate the maximum bending moment.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Electronic Drafting

**Course Abbreviation:** DDT 2513

**Classification:** Vocational-Technical Elective

**Description:** This course will introduce students to basic drafting skills necessary to produce block diagrams and schematics of electronic circuits. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to apply proper drafting formatting.
   a. Identify the acceptable line weights.
   b. Identify the primary lettering styles.
   c. Apply the principles of drafting tools and equipment.
   *Related Academic Topics (See Appendix A): C2, C3, C5*
   *Workplace Skills (See Appendix B): WP2, WP5*
2. Construct a block diagram.
   a. List three functions of a block diagram.
   b. Identify and apply the layout steps.
   c. Draw a diagram from a given sketch.
   *Related Academic Topics (See Appendix A): C2, C3, C5, M2, M3, M5*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
3. Develop the ability to identify and draw the most commonly used electronic symbols.
   a. Draw the basic electronic symbols.
   b. Match symbols to the correct reference designator.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
4. Construct a schematic diagram when provided a rough sketch.
   a. Apply the basic rules of layout for a schematic diagram.
   b. Lay out a schematic from a rough sketch, and add symbols and reference designators.
   *Related Academic Topics (See Appendix A): C2, C3, C5*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Pipe Drafting

**Course Abbreviation:** DDT 2523

**Classification:** Vocational-Technical Elective

**Description:** Pipe Drafting is designed to provide the student with the basic knowledge needed to create process piping drawings using individual piping components. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Develop the ability to define terms and piping components.
   a. Define terms used in the piping industry.
   b. Identify and describe piping components utilized in industry.
   *Related Academic Topics (See Appendix A): C1, C2, C3, C6, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP6*
2. Demonstrate the ability to draw process piping drawings.
   a. Develop a plan view, right side view, and front view from an isometric pipe drawing.
   b. Develop views of a pipe drawing from given data.
   c. Develop an isometric pipe drawing from plan and necessary views.
   *Related Academic Topics (See Appendix A): C1, C2, C3, C5, C6, M1, M2, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP4, WP5, WP6*

**Course Name:** Architectural Design II

**Course Abbreviation:** DDT 2623

**Classification:** Vocational-Technical Elective

**Description:** This course emphasizes standard procedures and working drawings. Details involving architectural, mechanical, electrical, and structural drawings are covered, along with presentation of drawings and computer-aided design assignments. (3 sch: 1 hr. lecture, 4 hr. lab)

**Prerequisites:** Architectural Design I (DDT 1613)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to create a set of custom working drawings.
   a. Develop and draw a plot plan.
   b. Design and draw a foundation plan and details.
   c. Design and draw a floor plan and schedules.
   d. Draw all four elevations.
   e. Design and draw cabinets and sectional views.
   f. Lay out and draw the electrical plan.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Develop a presentation drawing.
   a. Construct a pictorial with rendering and landscaping.
   b. Construct front elevation with rendering and landscaping.
   c. Construct floor plan.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Steel Ship Building and Design

**Course Abbreviation:** DDT 2543

**Classification:** Vocational-Technical Elective

**Description:** This course is designed to provide the student with an understanding of the ship as a whole and the process of ship design and planning. (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Fundamentals of Drafting (DDT 1114)

**Competencies and Suggested Objectives:**

1. Develop a basic understanding of the shipbuilding industry.
   a. Identify and describe the different types of metal ships.
   b. Define terms associated with the shipbuilding industry.
   c. Differentiate between conventional ship construction and modular construction processes.
   d. Identify and describe the major parts of a ship and discuss their relationship and function.
   e. Identify and describe various metals used in ship construction and describe their uses.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to develop drawings in the shipbuilding industry.
   a. Compare and contrast the welding and riveting processes as related to shipbuilding.
   b. Draw and define welding symbols used in ship blueprints.
   c. Draw prints for different sections and features of a ship.
   d. Contrast manual and computerized methods for lofting of ship drawings.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

**Course Name:** Special Project

**Course Abbreviation:** DDT 291(1-3)

**Classification:** Vocational-Technical Elective

**Description:** A course designed to provide the student with practical application of skills and knowledge gained in other drafting courses. The instructor works closely with the student to insure that the selection of a project will enhance the student's learning experience. (1-3 sch: 2-6 hr. lab)

**Prerequisites:** Consent of instructor

**Competencies and Suggested Objectives:**

1. Develop a written plan which details the activities and projects to be completed.
   a. Utilize a written plan which details the activities and projects to be completed.
   b. Perform written occupational objectives in the special project.
   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP1, WP6*
2. Assess accomplishment of objectives.
   a. Prepare a weekly written assessment of accomplishment of objectives.
   b. Present weekly written reports to instructor in activities performed and objectives accomplished.
   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP1, WP6*
3. Utilize a set of written guidelines for the special project.
   a. Develop and follow a set of written guidelines for the special project.
   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP1, WP6*

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**Course Name:** Work-Based Learning in Drafting and Design Technology

**Course Abbreviation:** DDT 292(1-6)

**Classification:** Vocational-Technical Elective

**Description:** This course is a cooperative program between industry and education and is designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of one semester hour per 45 industrial contact hours. (1-6 sch: 3-18 hr. externship)

**Prerequisites:** Consent of instructor and the completion of at least one semester of advanced coursework in the drafting program.

**Competencies and Suggested Objectives:**

1. Apply technical skills needed to be a viable member of the work force.
   a. Prepare a description of technical skills to be developed in the work-based learning program.
   b. Develop technical skills needed to be a viable member of the work force.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP1*
2. Apply skills developed in other program area courses.
   a. Perform skills developed in other program area courses in the work-based learning program.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP5, WP6*
3. Apply human relationship skills.
   a. Use pro-active human relationship skills in the work-based learning program.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP3*
4. Apply and practice positive work habits and responsibilities.
   a. Perform assignments to develop positive work habits and responsibilities.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP3*
5. Work with instructor and employer to develop written occupational objectives to be accomplished.
   a. Perform written occupational objectives in the work-based learning program.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP6*

6. Assess accomplishment of objectives.
   a. Prepare daily written assessment of accomplishment of objectives.
   b. Present weekly written reports to instructor in activities performed and objectives accomplished.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP6*
7. Utilize a set of written guidelines for the work-based learning program.
   a. Develop and follow a set of written guidelines for the work-based learning program.

   *Related Academic Topics (See Appendix A): C5, C6*
   *Workplace Skills (See Appendix B): WP6*

**Course Name:** Blueprint Reading I

**Course Abbreviation:** DDT 1513

**Classification:** Vocational-Technical Elective; Service course for masonry and carpentry programs

**Description:** This course is designed to provide the student with terms and definitions used in reading blueprints. (Enrollment in this course is limited to vocational certificate students in other disciplines.) (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** None

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to use the basic drawing equipment and terms used in sketching and making drawings.
   a. Identify terms, symbols, and lines used in blueprints.
   b. Utilize the basic equipment for sketching and/or drawing.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to interpret blueprints.
   a. Identify the three basic views of a drawing.
   b. Identify the various lines used on drawings.
   c. Interpret dimensions and symbols.
   d. Interpret general and specific notes on drawings.
   e. Locate features on drawings.
   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*
   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

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**Course Name:** Blueprint Reading II

**Course Abbreviation:** DDT 1523

**Classification:** Vocational-Technical Elective; Service course for masonry and carpentry programs

**Description:** This course is a continuation of Blueprint Reading I with emphasis placed on reading and interpreting blueprints for different types of structures. (Enrollment in this course is limited to vocational certificate students in other disciplines.) (3 sch: 2 hr. lecture, 2 hr. lab)

**Prerequisites:** Blueprint Reading I (DDT 1513)

**Competencies and Suggested Objectives:**

1. Demonstrate the ability to identify members in a structure and their purposes.
   a. Read and specify framing span charts for floor joists, ceiling joists, and rafters.
   b. Identify a minimum of five types of roofs and sketch them in a plan view.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*
2. Demonstrate the ability to perform calculations.
   a. Calculate square footage, cubic yards, board feet, and estimate quantities of the materials.
   b. Identify calculations related to commercial plans.

   *Related Academic Topics (See Appendix A): C2, C3, C5, C6, M2, M3, M5, M7, S8*

   *Workplace Skills (See Appendix B): WP2, WP5, WP6*

# RELATED ACADEMIC COURSES

July 30, 1996

**Course Name**: English Composition I

**Course Abbreviation:** ENG 1113

**Classification:** Related Academic

**Description:** A study of grammar and composition with emphasis on the sentence and the paragraph. Readings, frequent themes.

July 30, 1996

**Course Name**: Oral Communications (Principles of Speech)

**Course Abbreviation**: SPT 1113

**Classification**: Related Academic

**Description**: Correct and effective English; correct pronunciation and enunciation; breath control; study and practice in making speeches for all occasions; major emphasis on organization of material; and practice in speaking before the group.

July 30, 1996

**Course Name**: College Algebra

**Course Abbreviation:** MAT 1313

**Classification:** Related Academic

**Description:** This course includes equations, inequalities, functions and graphs, circles, polynomial and rational functions, and systems of equations and inequalities.

**Prerequisites:** At least two units of high school algebra or Intermediate Algebra (MAT 1233)

# SECTION III:

# RECOMMENDED TOOLS AND EQUIPMENT

## RECOMMENDED TOOLS AND EQUIPMENT FOR ALL DRAFTING PROGRAMS

1. CAD stations with current release AutoCAD (20)
2. Plotters (2)
3. Inkjet printers/laser printers (5)
4. Blueprint machine (1)
5. Drafting tables with chairs (21)
6. Parallel bars (21)
7. Paper cutters (2)
8. CAD station desk with chairs (20)
9. Total station with data collector, software, and accessories (1)
10. Transits/tripods (1 per 4 students)
11. Levels/tripods (1 per 4 students)
12. Survey rods (1 per 4 students)
13. Range poles (1 per 4 students)
14. Chains, steel tapes – 100 ft. or 200 ft. (1 per 4 students)
15. Chaining pins, set of eleven with holder (1 set per 4 students)
16. Hammers (2 pound) (1 per 4 students)
17. Plumb bobs with holder and string (2 per 4 students)
18. Flat files (30)
19. Bush axe (2)
20. Bush blades (2)
21. Digital caliper, 6" (1)
22. Metal protractor, 6" (1)
23. Radius gauge set (1)
24. Thread gauge set, English (1)

## RECOMMENDED INSTRUCTIONAL AIDS

1. Scientific calculator (1)
2. Cart, AV (for overhead projector) (1)
3. Cart, AV (for TV-VCR) (1)
4. Computer with operating software with multimedia kit (1)
5. Projector, overhead (1)
6. TV-VCR (1)
7. Video out (Microcomputer to TV monitor) (1)

# APPENDIX A:

# RELATED ACADEMIC TOPICS

APPENDIX A

## RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

## EXPANDED TOPICS FOR COMMUNICATIONS

TOPIC C1: Interpret written material.

C1.01 Read and follow complex written directions.
C1.02 Recognize common words and meanings associated with a variety of occupations.
C1.03 Adjust reading strategy to purpose and type of reading.
C1.04 Use sections of books and reference sources to obtain information.
C1.05 Compare information from multiple sources and check validity.
C1.06 Interpret items and abbreviations used in multiple forms.
C1.07 Interpret short notes, memos, and letters.
C1.08 Comprehend technical words and concepts.
C1.09 Use various reading techniques depending on purpose for reading.
C1.10 Find, read, understand, and use information from printed matter or electronic sources.

TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

C2.01 Use visuals in written and in oral presentations.
C2.02 Recognize visual cues to meaning (layout, typography, etc.).
C2.03 Interpret and apply information using visual materials.

TOPIC C3: Listen, comprehend, and take appropriate action.

C3.01 Identify and evaluate orally-presented messages according to purpose.
C3.02 Recognize barriers to effective listening.
C3.03 Recognize how voice inflection changes meaning.
C3.04 Identify speaker signals requiring a response and respond accordingly.
C3.05 Listen attentively and take accurate notes.
C3.06 Use telephone to receive information.

C3.07 Analyze and distinguish information from formal and informal oral presentations.

TOPIC C4: Access, organize, and evaluate information.

C4.01 Distinguish fact from opinion.
C4.02 Use various print and non-print sources for specialized information.
C4.03 Interpret and distinguish between literal and figurative meaning.
C4.04 Interpret written or oral communication in relation to context and writer's point of view.
C4.05 Use relevant sources to gather information for written or oral communication.

TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.

C5.01 Select appropriate words for communication needs.
C5.02 Use reading, writing, listening, and speaking skills to solve problems.
C5.03 Compose inquiries and requests.
C5.04 Write persuasive letters and memos.
C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
C5.08 Select and use appropriate formats for presenting reports.
C5.09 Convey information to audiences in writing.
C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.

TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.

C6.01 Give complex oral instructions.
C6.02 Describe a business or industrial process/mechanism.
C6.03 Participate effectively in group discussions and decision making.
C6.04 Produce effective oral messages utilizing different media.
C6.05 Explore ideas orally with partners.
C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
C6.08 Gather and provide information utilizing different media.

C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

**RELATED ACADEMIC TOPICS FOR MATHEMATICS**

M1 Relate number relationships, number systems, and number theory.
M2 Explore patterns and functions.
M3 Explore algebraic concepts and processes.
M4 Explore the concepts of measurement.
M5 Explore the geometry of one-, two-, and three-dimensions.
M6 Explore concepts of statistics and probability in real world situations.
M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
M1.04 Investigate relationships among fractions, decimals, and percents.
M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
M1.08 Use computation, estimation, and proportions to solve problems.
M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

M2.01 Describe, extend, analyze, and create a wide variety of patterns.
M2.02 Describe and represent relationships with tables, graphs, and rules.
M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
M2.04 Use patterns and functions to represent and solve problems.
M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.

M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.
M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.
M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.
M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.

TOPIC M4: Explore the concepts of measurement.

M4.01 Estimate, make, and use measurements to describe and compare phenomena.
M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.
M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.
M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.

TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.

M5.01 Identify, describe, compare, and classify geometric figures.
M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.
M5.03 Explore transformations of geometric figures.
M5.04 Understand and apply geometric properties and relationships.
M5.05 Classify figures in terms of congruence and similarity and apply these relationships.

TOPIC M6: Explore the concepts of statistics and probability in real world situations.

M6.01 Systematically collect, organize, and describe data.
M6.02 Construct, read, and interpret tables, charts, and graphs.
M6.03 Develop an appreciation for statistical methods as powerful means for decision making.
M6.04 Make predictions that are based on exponential or theoretical probabilities.

M6.05 Develop an appreciation for the pervasive use of probability in the real world.

TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

**RELATED ACADEMIC TOPICS FOR SCIENCE**

S1 Explain the Anatomy and Physiology of the human body.
S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
S3 Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.
S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

S1.01 Recognize common terminology and meanings.
S1.02 Explore the relationship of the cell to more complex systems within the body.

S1.03 Summarize the functional anatomy of all the major body systems.
S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
S1.05 Compare and contrast disease transmission and treatment within each organ system.
S1.06 Explore the usage of medical technology as related to human organs and organ systems.
S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
S2.02 Explain sexual and asexual reproduction.
S2.03 Describe the ecological importance of plants as related to the environment.
S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.

S3.01 Explain the morphology, anatomy, and physiology of animals.
S3.02 Describe the characteristics, behaviors, and habitats of selected animals.

TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.

S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
S4.03 Consider the effects of weather and climate on the environment.
S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.

TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.

S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.

S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.
S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.
S5.04 Relate the behavior of gases.
S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.

TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.

S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.
S6.02 Explore the concepts and relationships among work, power, and energy.
S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.
S6.04 Identify principles of modern physics related to nuclear physics.

TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.

S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.
S7.02 Apply the concept of population genetics to both microbial and multicellular organism.
S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.
S8.02 Observe and practice safe procedures in the classroom and laboratory.
S8.03 Demonstrate proper use and care for scientific equipment.
S8.04 Investigate science careers, and advances in technology.
S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

# APPENDIX B:

# WORKPLACE SKILLS

# APPENDIX B
# WORKPLACE SKILLS FOR THE 21ST CENTURY

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

# APPENDIX C:

# STUDENT COMPETENCY PROFILES

# STUDENT COMPETENCY PROFILE
# FOR ARCHITECTURAL DRAFTING TECHNOLOGY

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each course. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the program.

In the blank before each competency, place the date on which the student mastered the competency.

Fundamentals of Drafting (DDT 1114)

_____ 1. Discuss classroom procedures and drafting occupations.
_____ 2. Explain and apply safety rules and regulations.
_____ 3. Demonstrate the ability to apply proper techniques in instrument drawings.
_____ 4. Demonstrate the ability to sketch and develop views of basic shapes.
_____ 5. Demonstrate the ability to use geometric constructions.
_____ 6. Demonstrate the ability to construct orthographic projections.
_____ 7. Demonstrate the ability to dimension objects.
_____ 8. Demonstrate the ability to construct sectional views.

Principles of CAD (DDT 1313)

_____ 1. Demonstrate the ability to manage the operating system.
_____ 2. Demonstrate the ability to use the basic hardware of the CAD system.
_____ 3. Demonstrate the ability to perform drafting functions on the CAD system.

Machine Drafting I (DDT 1133)

_____ 1. Demonstrate the ability to create drawings of fasteners.
_____ 2. Prepare drawings for production.
_____ 3. Prepare welding drawings.

Intermediate CAD (DDT 1323)

_____ 1. Demonstrate the ability to dimension drawings by the use of CAD.
_____ 2. Draw sectional views in CAD.

Descriptive Geometry (DDT 1153)

_____ 1. Demonstrate the ability to develop views.
_____ 2. Demonstrate the ability to solve problems of spatial relationships.
_____ 3. Demonstrate the ability to solve problems of lines, planes, and angles.

Architectural Design I (DDT 1613)

_____ 1. Demonstrate the ability to plan a simple residential structure.
_____ 2. Demonstrate the ability to draw a complete set of working drawings for a simple architectural structure.

Elementary Surveying (DDT 1413)

_____ 1. Demonstrate the ability to measure and record various measurements.
_____ 2. Demonstrate the use of surveying equipment, terms, and signals.

Advanced CAD (DDT 2343)

_____ 1. Chart a "slide show."
_____ 2. Assign attributes and generate a bill of materials.
_____ 3. Demonstrate the ability to create wire frame 3-D objects (3DFACF).
_____ 4. Demonstrate the ability to create solid models.

Structural Drafting (DDT 2233)

_____ 1. Demonstrate the ability to utilize data on design of structural members.
_____ 2. Demonstrate the ability to construct structural plans.

Mapping and Topography (DDT 2423)

_____ 1. Demonstrate the ability to plan and draw a map.
_____ 2. Demonstrate the ability to transform field notes into engineering drawings.

Machine Drafting II (DDT 2163)

_____ 1. Create drawings from a given mechanical part.
_____ 2. Demonstrate the ability to construct design working drawings.

Quality Assurance (DDT 2263)

_____ 1. Demonstrate the ability to utilize basic quality assurance procedures.
_____ 2. Demonstrate the ability to effectively use sampling techniques.
_____ 3. Demonstrate the ability to effectively use various charts.

Geometric Dimensioning and Tolerancing (DDT 1143)

_____ 1. Demonstrate the ability of dimensioning and tolerancing symbols, terms, definitions, and concepts.
_____ 2. Demonstrate the ability to apply "geometric dimensioning and tolerancing" on a drawing.

Construction Materials (DDT 1213)

_____ 1. Describe the uses of wood components used in construction.
_____ 2. Describe concrete characteristics.
_____ 3. Describe the use of bricks in construction.
_____ 4. Describe various cover materials used in construction.

Fundamentals of Machining Processes (DDT 1713)

_____ 1. Demonstrate the ability to identify and apply skills to basic machining processes.
_____ 2. Discuss the safe use of basic tools and machines.

Highway Drafting (DDT 2533)

_____ 1. Identify basic information for highway drafting.
_____ 2. Demonstrate the ability to draw horizontal and vertical alignment of route surveys.
_____ 3. Demonstrate the ability to draw typical and cross sections.

Cost Estimating (DDT 2243)

_____ 1. Develop the ability to make a cost estimate of a residential and commercial building.
_____ 2. Demonstrate the ability to determine the best construction method.
_____ 3. Develop the ability to apply the principles of contracts for construction.
_____ 4. Demonstrate the ability to complete a materials list for a structure.

Statics and Strength of Materials (DDT 2253)

_____ 1. Demonstrate the ability to apply basic procedures of determining the behavior of structures under loads.
_____ 2. Demonstrate the ability to determine the loadings of structures.

Electronic Drafting (DDT 2513)

_____ 1. Demonstrate the ability to apply proper drafting formatting.
_____ 2. Construct a block diagram.
_____ 3. Develop the ability to identify and draw the most commonly used electronic symbols.
_____ 4. Construct a schematic diagram when provided a rough sketch.

Pipe Drafting (DDT 2523)

_____ 1. Develop the ability to define terms and piping components.
_____ 2. Demonstrate the ability to draw process piping drawings.

Architectural Design II (DDT 2623)

_____ 1. Demonstrate the ability to create a set of custom working drawings.
_____ 2. Develop a presentation drawing.

Steel Ship Building and Design (DDT 2543)

_____ 1. Develop a basic understanding of the shipbuilding industry.
_____ 2. Demonstrate the ability to develop drawings in the shipbuilding industry.

Special Project [DDT 291(1-3)]

_____ 1. Develop a written plan which details the activities and projects to be completed.
_____ 2. Assess accomplishment of objectives.
_____ 3. Utilize a set of written guidelines for the special project.

Work-Based Learning in Drafting and Design Technology [DDT 292(1-6)]

_____ 1. Apply technical skills needed to be a viable member of the work force.
_____ 2. Apply skills developed in other program area courses.
_____ 3. Apply human relationship skills.
_____ 4. Apply and practice positive work habits and responsibilities.

_____ 5. Work with instructor and employer to develop written occupational objectives to be accomplished.

_____ 6. Assess accomplishment of objectives.

_____ 7. Utilize a set of written guidelines for the work-based learning program.

# STUDENT COMPETENCY PROFILE
# FOR DRAFTING AND DESIGN TECHNOLOGY

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_____ 1. Chart a "slide show."
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_____ 3. Demonstrate the ability to create wire frame 3-D objects (3DFACF).
_____ 4. Demonstrate the ability to create solid models.

Quality Assurance (DDT 2263)

_____ 1. Demonstrate the ability to utilize basic quality assurance procedures.
_____ 2. Demonstrate the ability to effectively use sampling techniques.
_____ 3. Demonstrate the ability to effectively use various charts.

Computer Numerical Control (CNC) Drafting (DDT 2362)

_____ 1. Demonstrate the ability to identify the basic functions of CNC.
_____ 2. Develop the ability to define the principles of the coordinate systems.
_____ 3. Identify the principles of the code system.
_____ 4. Develop the ability to prepare and execute a basic CNC program.

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_____ 2. Demonstrate the ability to construct structural plans.

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_____ 1. Develop a written plan which details the activities and projects to be completed.
_____ 2. Assess accomplishment of objectives.
_____ 3. Utilize a set of written guidelines for the special project.

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_____ 1. Apply technical skills needed to be a viable member of the work force.
_____ 2. Apply skills developed in other program area courses.
_____ 3. Apply human relationship skills.
_____ 4. Apply and practice positive work habits and responsibilities.
_____ 5. Work with instructor and employer to develop written occupational objectives to be accomplished.
_____ 6. Assess accomplishment of objectives.
_____ 7. Utilize a set of written guidelines for the work-based learning program.